

PATENT SPECIFICATION

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(54) EDIBLE MEAT COATINGS

(71) We, W. R. GRACE & Co., a Corporation organised under the laws of Connecticut, United States of America, of 7 Hanover Square, New York, New York 5 10005, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the 10 following statement:—

The present invention relates to meat coating compositions, and meat products coated therewith.

It is known that a wide variety of meat 15 products may be advantageously coated with edible compositions which contain fat or water, and seasoning agents. These coatings frequently perform the function of protecting the meat from dehydration 20 during storage and also of providing desirable flavoring components during cooking.

Prior art coating compositions frequently 25 are limited in their effectiveness in that they tend to liquefy and run off at cooking temperatures. Obviously, this tendency to run off prevents absorption of the flavoring ingredients by the meat product. The meat coating composition of this invention remains stable and intact at low storage temperatures but sufficiently viscous to prevent 30 excessive loss during cooking. The coated meat product will be capable to undergo extended cold storage and will be effectively seasoned upon cooking when seasoning is 35 used.

Broadly, the present invention involves 40 an edible meat coating composition which comprises a water-in-oil emulsion the aqueous phase of which contains an edible water-soluble gum.

More specifically, we have found that a 45 relatively low proportion of a thermal gelling water soluble gum, such as methyl-cellulose, when contained in the water phase of a water-in-oil emulsion, produces

the unexpected result of forming a coherent gelatinized matrix from the coating when heated during the cooking to temperatures in the neighbourhood of 70-94°C. This phenomenon of thermal gelation retards the 50 loss of coating composition during cooking and increases the absorption of the coating product during the cooking process.

The present coating compositions contain 55 two primary ingredients:

The first is the water-in-oil emulsion generally disclosed in our patent application No. 50717/66 (Serial No. 1,163,943); and the second is an edible, thermal gelling, 60 water-soluble gum, such as methyl-cellulose. Optional, but preferred, ingredients include 65 seasoning and/or preserving ingredients for imparting desired flavour and stability to the coating composition.

The present emulsions contain (1) from 65 6 to 98 parts by weight of fat, (2) from 2 to 74 parts by weight of water, (3) from 0.1 to 22% by weight of said fat consisting of an emulsifying composition (a) from 1 70 to 12 parts by weight of an edible, non-ionic, emulsifier or emulsifier combination having an hydrophilic and lipophilic balance (as defined by Becher in ACS Monograph 135, 1956) of from 3 to 6, comprising a hydrophilic emulsifier being 75 present in an amount of from 0 to 75% by weight of the emulsifier or emulsifier combination and a lipophilic emulsifier being present in an amount of from 100 to 25% by weight of the emulsifier or emulsifier combinations the lipophilic emulsifier 80 having an iodine value of 8 or above and (b) from 0.0 to 10 parts by weight of an edible wax and (B) from 0.3 to 2.0 parts by weight of an edible thermal gelling 85 water-soluble gum per 100 parts by weight of said emulsion.

In the above definition of the emulsion, the amounts of the emulsifier or emulsifier composition included are considered to be 90

2 part of the total fat constituent. For example, should an emulsion contain 60 parts by weight total fat and 40 parts by weight water, and it is also intended that 3 7% by weight emulsifying composition is to be added; the weight of the emulsifying composition will be $7\% \times 60 = 4.2$ parts by weight. Furthermore, since the emulsifying composition ingredient is considered to be part of the total fat, the amount of fat necessary to complete the composition will be $60 - 4.2 = 55.8$ parts by weight.

15 Fats, emulsifiers, waxes, if any, and other ingredients used in the preparation of the present emulsion are described in the above-identified application, as is the method of preparing the same.

It has been found that from 0.3 to 2.0 parts by weight methylcellulose per 100 parts by weight of emulsion will provide the desired increase in high temperature gelled strength. Methylcellulose used in the practice of the present invention may be 25 of either the high or low viscosity types which possess viscosities in the range of from 100 to 4000 centipoises in 2% water solution at 20°C. It is generally found that the higher viscosity methylcellulose products are preferred in view of the fact that they impart greater increase in high temperature gel strength by weight of product used. However, low viscosity types may be appropriately adapted for use in the present 35 invention by merely increasing the concentration to the upper limits described above. In general, the specific type of methylcellulose used will primarily be an economic consideration.

40 The methylcellulose component is preferably added to the water component of the emulsion, at a temperature above about 40°C., before the emulsion is formed.

The present coating compositions preferably include seasoning agents and/or preservative agents which provide the desired degree and type of seasoning upon final cooking of the coated product. Typical seasonings which may be incorporated in 45 the present compositions include salt, dehydrated onion, pepper, nutmeg, protein hydrolysates and autolysates, sugar, tomato puree, and apple juice. In addition, preservative agents such as sorbic acid and/or 50 benzoic acid and salts may be included. In general, the combined weight of the seasoning or preservative agents added to the 55 predefined emulsion-methylcellulose compositions range from about 0 to 77 parts by weight. However, this ratio is not particularly critical and practically any range of seasoning additive may be utilized so long as the desired water-in-oil emulsion is maintained.

60 Meat products which may be coated with

the present composition include practically all types of edible proteinaceous materials. Typical examples are various cuts of pork, beef, chicken, as well as comminuted meat and sausage type products obtained therefrom. Furthermore, various fish products, such as fish, shrimps, clams, and oysters, may be advantageously coated. Various synthetic meat products prepared from plant protein or regenerated animal protein 75 may also be advantageously coated and/or combined with the coatings contemplated herein.

The present coating compositions are uniformly applied to meat products by any 80 convenient means, such as dipping or spraying. Typically, a frozen or substantially frozen piece of meat, which may be totally raw or partially cooked and even thoroughly precooked, may be dipped into a liquid 85 body of the present coating composition. The thickness of the coating of the meat will depend upon the viscosity at the applied temperature, the temperature of the meat and the immersion time of the meat 90 in the coating. Ordinarily, it is preferred to coat the product with a thickness of from about 0.25 to about 2.5 mm. However, substantially thicker coatings may be applied, if desired. For example, in some 95 instances it may be desired to embed the meat in a solid block of the present coating. Generally, the composition will comprise from 5 to 25% by weight of the coated product.

100 Frozen meat pieces which are to be coated with the present product are advantageously maintained at a temperature of from about -17°C. to +16°C. When the meat being coated is maintained at this 105 temperature, the coating composition is generally maintained in liquid state at a temperature preferably in the range of from about 26°C. to 50°C., whereat the composition is fluid but not sufficiently 110 warm to cause undue thawing of the meat surface and sufficient temperature differential exists to create the required chilling of the liquid emulsion upon the meat. The 115 liquid emulsions which contain wax generally may be maintained in a quiescent state during application. However, those emulsion compositions which do not contain wax are preferably maintained under agitation during the application procedure, so as to keep 120 the emulsion in the preferred uniform condition.

125 The meat products coated in accordance with the present invention are capable of undergoing extended storage periods without undergoing any substantial dehydration. Storage temperatures of from about -17°C. to about -45°C. are normally sufficient to maintain the present coating in a continuous and uniform state throughout 130

the storage.

The coated meat product is prepared for eating merely by heating the product to the desired cooking/eating temperature which is normally in the range of 70°C. to 82°C. Obviously, the degree of heating required will depend upon the initial degree of cooking which the coated product has undergone and the preferences of the consumer involved.

The following Examples are illustrate the present invention.

Example I

15 A poultry seasoning coating, was prepared from the following ingredients:

	% by weight
20	Beeswax, natural 1.410
	Vegetable oil 35.625
	Glyceryl monooleate 1.410
	Water 37.749
	Protein autolysate (Bio-Sol 15530) 13.250
25	Poultry seasoning spice mixture 0.531
	Dehydrated onion powder 0.812
	Sucrose 8.000
	Dehydrated parsley 0.125
30	Sorbic acid 0.100
	Sodium Benzoate 0.100
	Methylcellulose, Methocel MC. 4000 cps. 3.538
35	Tartaric acid, 20% solution 0.350
	Colour as desired
	The words "Bio-Sol" and "Methocel" are Trade Marks.

The vegetable oil, beeswax and monoglyceride were uniformly mixed in a separate container. Then the remainder of the ingredients were added to the water component at 46°C. and thoroughly admixed in another container. The liquified fat mixture was then cooled to 46°C. and maintained in the bowl of a planetary mixer fitted with a wire whip. The aqueous phase was heated to 46°C. and was added in a small stream to the fat phase with continuous mixing. The mixing was continued for ten minutes subsequent to the complete addition of the water phase. During the mixing operation, the mixture was permitted to cool to about 30°C.

55 The above mixture was maintained at 40°C. and pieces of chicken were dipped therein. A smooth uniform coating was obtained which comprised approximately 12% of the weight of the coated meat product. The emulsion hardened to a relatively non-greasy coating in ten to 15 seconds. Upon cooling the frozen coated pieces at a temperature above 72°C., the coating was retained upon the chicken 65 parts.

Example II

A pork seasoning coating was prepared from the following ingredients:

	% by weight
	70
Vegetable oil	33.50
Beeswax, natural	1.40
Glyceryl monooleate	1.40
Apple Juice	56.80
Dehydrated onion	0.50
Protein, autolysate (Bio-Sol 15530)	5.26
Pepper	0.05
Salt	0.03
Nutmeg	0.06
Sorbic acid	0.10
Sodium benzoate	0.10
Methylcellulose, Methocel MC. 4000 cps	0.80
	85

The above ingredients were admixed in a manner similar to that set forth in Example I. Frozen pork chops were dipped into the above emulsion which was maintained at a temperature of about 40°C. A coating of approximately 1.6 mm. in thickness was obtained, which comprised approximately 18% by weight of the coated product. The frozen coated pieces, after cooking in foil for 90 minutes at 218°C., were found to possess superior eating qualities.

Example III

A barbecue coating was prepared from the following ingredients:

	% by weight
	35.625
Vegetable oil	1.410
Beeswax	105
Glyceryl monooleate (Myverol 18-85)	1.410
Barbeque sauce	31.250
Tomato juice	18.750
Protein autolysate (Bio-Sol 15530)	7.812
Dehydrated onion	0.625
Worcestershire sauce	0.125
Corn Syrup	2.190
Chili powder	0.125
Sorbic acid	0.100
Sodium benzoate	0.100
Methylcellulose, Methocel MC 4000 cps	1.000

The word "Myverol" is a Trade Mark.

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The above ingredients were admixed in a manner set forth in Example I.

The above composition was applied to beef pieces by dipping frozen meat pieces in the above emulsion which was maintained at 40°C. A smooth uniform coating which comprises 15 to 18% by weight of the coated meat product was obtained. The frozen coated pieces, after cooking in an oven, showed good retention of coating 130

and an enhanced flavour and juiciness.

We are aware of "The Preservatives in Food Regulations 1962" and, in so far as our invention relates to the use of sorbic acid, benzoic acid and sodium benzoate, we make no claim to use the invention in contravention of the law.

WHAT WE CLAIM IS:—

- 10 1. A meat coating composition comprising (A) a water-in-oil emulsion of (1) from 6 to 98 parts by weight of fat, (2) from 2 to 74 parts by weight of water and (3) from 0.1 to 22% by weight of said fat consisting of an emulsifying composition containing (a) from 1 to 12 parts by weight of an edible, non-ionic, emulsifier or emulsifier combination having an hydrophilic and lipophilic balance (as defined by Becher in 20 ACS monograph 135, 1956) of from 3 to 6, comprising a hydrophilic emulsifier being present in an amount of from 0 to 75% by weight of the emulsifier or emulsifier combination and a lipophilic emulsifier being present in an amount of from 100 to 25% by weight of the emulsifier or emulsifier combinations the lipophilic emulsifier having an iodine value of 8 or above and (b) from 0.0 to 10 parts by weight of an 30 edible wax and (B) from 0.3 to 2.0 parts by weight of an edible thermal gelling water-soluble gum per 100 parts by weight of said emulsion.
2. A composition according to Claim 1 which further contains up to 77 parts based on the weight of the emulsion of seasoning ingredients.
3. A composition according to Claim 1.

wherein the edible water-soluble gum is methyl cellulose.

4. A composition according to Claim 3, wherein the methyl cellulose possesses a viscosity of from 100 to 4000 CPS in 2% water solution at 20°C.

5. A poultry seasoning coating composition, substantially as described in foregoing Example I.

6. A pork seasoning coating composition, substantially as described in foregoing Example II.

7. A barbecue coating composition, substantially as described in foregoing Example III.

8. A meat product coated with a coating composition of any one of the preceding 55 claims, wherein the composition comprises from 5 to 25% by weight of the coated product.

9. A method of coating a meat product, which comprises coating the meat product 60 with a coating composition of any one of Claims 1 to 7 to produce a coated product which comprises from 5 to 25% by weight of coating composition.

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